

TRANSFORMATION OF ARABIC LANGUAGE LEARNING BASED ON AUGMENTED REALITY: BUILDING AN IMMERSIVE AND INTERACTIVE LEARNING EXPERIENCE IN ISLAMIC BOARDING SCHOOL-BASED ELEMENTARY SCHOOLS

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ABSTRAK

Penelitian ini bertujuan untuk mengkaji transformasi pembelajaran Bahasa Arab melalui pemanfaatan media Augmented Reality (AR) sebagai upaya membangun pengalaman belajar yang immersif dan interaktif di sekolah dasar berbasis pesantren. Latar belakang penelitian ini didasari oleh masih dominannya penggunaan metode pembelajaran Bahasa Arab konvensional di lingkungan pesantren, sementara karakteristik peserta didik generasi digital menuntut pengalaman belajar kosakata (mufradat), nahwu, dan keterampilan berbahasa yang lebih visual, kontekstual, dan partisipatif. Penelitian ini menggunakan pendekatan kualitatif dengan jenis penelitian kepustakaan (library research), yaitu menelusuri, menganalisis, dan mensintesis berbagai sumber pustaka berupa artikel jurnal, buku, dan hasil penelitian terdahulu yang relevan dengan implementasi AR dalam pembelajaran Bahasa Arab dan pendidikan Islam. Data dikumpulkan melalui studi dokumentasi dari basis data akademik seperti Google Scholar, Scopus, dan repositori jurnal nasional, kemudian dianalisis menggunakan teknik analisis isi (content analysis) dengan tahapan reduksi, kategorisasi, dan sintesis tematik. Hasil kajian menunjukkan bahwa AR memiliki potensi besar dalam meningkatkan motivasi belajar Bahasa Arab, memperkuat penguasaan kosakata melalui visualisasi tiga dimensi, serta mendorong keterlibatan aktif siswa dalam aktivitas berbahasa. Namun demikian, implementasinya di lingkungan sekolah dasar berbasis pesantren masih dihadapkan pada tantangan berupa keterbatasan infrastruktur teknologi, kesiapan kompetensi digital guru Bahasa Arab, serta kebutuhan kurasi konten yang selaras dengan nilai-nilai keislaman. Kebaruan (novelty) penelitian ini terletak pada sintesis kerangka integrasi AR yang secara spesifik memadukan prinsip pedagogi pembelajaran Bahasa Arab berbasis pesantren dengan teknologi immersive. Penelitian ini merekomendasikan pengembangan modul konten AR mufradat dan qawa'id berbasis nilai keislaman serta program pelatihan guru Bahasa Arab sebagai langkah strategis penerapan media ini secara bertahap.

Kata Kunci: Augmented Reality, Pembelajaran Bahasa Arab, Mufradat, Immersive Learning, Teknologi Pendidikan Islam.

ABSTRACT

This study aims to examine the transformation of Arabic learning through the use of Augmented Reality (AR) media as an effort to build an immersive and interactive learning experience in pesantren-based elementary schools. The background of this research is based on the still dominant use of conventional Arabic learning methods in the pesantren environment, while the characteristics of digital generation students require more visual, contextual, and participatory vocabulary learning experiences (mufradat), nahwu, and language skills. This research uses a qualitative approach with the type of library research, which is to trace, analyze, and synthesize various library sources in the form of journal articles, books, and previous research results that are relevant to the implementation of AR in Arabic language learning and Islamic education. Data was collected through documentation studies from academic databases such as Google Scholar, Scopus, and national journal repositories, then analyzed using content analysis techniques with stages of reduction, categorization, and thematic synthesis. The results of the study show that AR has great potential in increasing motivation to learn Arabic, strengthening vocabulary mastery through three-dimensional visualization, and encouraging active involvement of students in language activities. However, its implementation in the pesantren-based elementary school environment is still faced with challenges in the form of limited technological infrastructure, readiness of Arabic teachers' digital competencies, and the need for content curation that is in line with Islamic values. The novelty of this research lies in the synthesis of the AR integration framework which specifically combines the pedagogical principles of Islamic boarding school-based Arabic learning with immersive technology. This study recommends the development of AR mufradat and qawa'id content modules based on Islamic values as well as Arabic teacher training programs as a strategic step in the implementation of this media in stages.

Keyword: Augmented Reality, Arabic Language Learning, Mufradat, Immersive Learning, Islamic Educational Technology.

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1. PENDAHULUAN

Arabic is one of the core subjects in the curriculum of integrated Islamic educational institutions, including at the pesantren-based elementary school level. This is because Arabic not only functions as a means of communication, but also as the main language in understanding Islamic sources such as the Qur'an, Hadith, and various classical Islamic literature. Therefore, mastery of Arabic has value that is not only academic, but also religious and part of a Muslim's scientific identity (Islami et al., 2025). With this very important position,

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Arabic learning should be designed effectively, interestingly, and in accordance with the characteristics of students.

However, the reality on the ground shows that Arabic learning in pesantren-based elementary schools still uses a traditional approach. Methods that are often used include memorizing vocabulary from a whiteboard, using static textbooks, and one-way explanations from teachers. This approach tends to make students passive and less actively involved in the learning process. In addition, the method is not in line with the characteristics of the current generation known as digital natives, namely the generation that is used to technology, visualization, interactivity, and learning experiences that are more contextual and fun (Pratama et al., 2025). As a result, learning Arabic is often considered difficult, boring, and less interesting for elementary school students.

Along with the development of technology, various innovations have emerged that can be used to improve the quality of learning, one of which is Augmented Reality (AR) technology. AR is a technology that is able to combine digital objects such as three-dimensional models, animations, text, and sounds into the real world in real-time through devices such as smartphones or tablets (Alharthi, 2023). In the context of learning Arabic, this technology can be used to display vocabulary (mufradat) in the form of three-dimensional objects equipped with Arabic writing, harakat, and audio pronunciation. Thus, students not only memorize words, but also be able to see the shape of the object, hear the way they are pronounced, and understand their meaning more concretely (Zuo et al., 2023). This approach makes the learning process more lively, interactive, and easy for beginner students to understand.

Despite having great potential, the application of AR in Arabic language learning in pesantren-based elementary schools is still relatively minimal. Most of the previous research focused more on the use of AR in the fields of science and mathematics, while its application in Arabic language learning, especially those integrated with Islamic values, has not been studied in depth (Rosyidah, 2024). In fact, research by Abdullah et al. (2025) shows that the use of visual and innovative approaches in the presentation of Arabic vocabulary is able to significantly improve language skills. This shows that interactive visual-based learning media is very relevant to be further developed, including through the use of AR technology (Abdullah et al., 2025).

In addition, other research also reinforces the importance of using interactive technology in Arabic language learning. Barzanji and Mohammed (2022) found that the application of gamification can significantly improve Arabic vocabulary mastery in EFL students. Meanwhile, Abdullah et al. (2025) show that the integration of digital gamification with problem-based learning in modern Islamic boarding schools can be well received by students without eliminating pesantren values (Barzanji & Mohammed, 2022; Abdullah et al., 2025). These findings indicate that interactive technologies, including AR, have great opportunities to be applied in pesantren-based elementary schools as long as they are designed with regard to the values, culture, and characteristics of the pesantren environment (Rosyidah, 2024).

Based on this background, this research is focused on answering three main questions, namely: (1) how are the characteristics and working principles of AR technology relevant for Arabic language learning in pesantren-based elementary schools; (2) what are the potential pedagogical benefits of the use of AR in Arabic language learning; and (3) what challenges may arise and strategies that can be taken to overcome them (Wahyudin & Aristiawan, 2024). The novelty of this research lies in the effort to develop an integrative conceptual framework that specifically links AR technology with Arabic language learning in the context of Islamic basic education based on pesantren (Novrizal et al., 2025).

Through this research, it is hoped that theoretical contributions can be made in the form of developing the concept of AR integration that is in line with Islamic values, as well as practical contributions in the form of recommendations for teachers and educational institutions in developing Arabic learning media that are innovative, interactive, and relevant to the needs of students in the digital era.

2. METODE

Types and Approaches to Research

This research uses a qualitative approach with the type of library research. This approach was chosen because the purpose of the research is to explore, analyze, and synthesize concepts, theories, and empirical findings from various literature sources related to the application of AR in Arabic language learning, without primary data collection in the field (Alharthi, 2023). Literature research allows researchers to build a comprehensive conceptual framework based on previously published knowledge accumulation (Fauzan & Arifin, 2023).

Data Source

The data source is in the form of secondary data from library documents, including articles from national and international scientific journals, reference books, and the results of previous research relevant to the theme of AR, Arabic learning media, language gamification, and Islamic basic education. The search was conducted through the academic databases Google Scholar, Scopus, ResearchGate, and the SINTA journal portal with the keywords 'Augmented Reality Arabic language', 'AR Arabic language learning', 'AR learning media', and 'Islamic educational technology' (Hidayat & Syarifuddin, 2020; Pratama et al., 2025).

Data Collection Techniques

Data collection is carried out through documentation study techniques by searching, reading, recording, and compiling relevant information from identified library sources. The stages include: (1) identification of keywords and criteria for inclusion-exclusion of sources; (2) literature screening (preferably 2020–2026); (3) organizing documents using reference management applications; and (4) the creation of summaries and thematic mapping of each source (Novrizal et al., 2025).

Data Analysis Techniques

Data were analyzed using content analysis techniques with a descriptive-qualitative approach following the Miles and Huberman model: data reduction, thematic categorization,

data presentation, and conclusion drawn. The major themes generated include: characteristics of AR technology for Arabic, pedagogical benefits, implementation challenges, and strategies for integrating Islamic values in Arabic AR content (Fauzan & Arifin, 2023).

Research Flow

Table 1 below illustrates the flow of the stages of literature research taken.

Stages	Activities	Output
1	Identify the topic and formulate the problem	Study focus: AR for Arabic in pesantren-based elementary schools
2	Search keyword determination	Multilingual keyword list
3	Literature screening (2020-2026)	25+ Relevant Sources Selected
4	Thematic reduction and categorization	4 main themes of the study results
5	Content synthesis and analysis	Conceptual framework of Arabic AR integration
6	Preparation of conclusions and recommendations	Recommendations for phased implementation

RESULTS AND DISCUSSION

Relevant Characteristics of AR for Arabic Language Learning

Augmented Reality (AR) is a technology that allows the incorporation of two- or three-dimensional virtual objects into the real environment in real-time so that users can interact with the object through devices such as smartphones or tablets. In contrast to Virtual Reality (VR) which replaces the entire real environment, AR enriches the real environment with an additional layer of digital information (Alharthi, 2023). In the context of learning Arabic, the main advantage of AR lies in its ability to present visualization of vocabulary, grammar, and the context of language use in an immersive manner in front of students' eyes.

There are three main components of the AR ecosystem in Arabic language learning: (1) markers, in the form of QR codes or images that are scanned to bring up Arabic-language digital content; (2) display devices, generally smartphones or tablets; and (3) Arabic digital content, in the form of 3D models labeled *mufradat*, dialogue animations, visualization of sentence structure (number), or audio pronunciation designed according to the Islamic boarding school's Arabic curriculum (Pratama et al., 2025).

In vocabulary learning (*mufradat*), students only need to point the camera at a marker card with a picture of a certain object or situation, then the AR application displays a 3D object accompanied by name labels in Arabic writing, transliteration, and audio pronunciation correctly. This kind of spatial interaction directly reinforces multisensory associations between visual forms, sounds, and meanings, which is one of the most effective strategies in the acquisition of foreign language vocabulary (Zuo et al., 2023).

Table 2. Comparison of Arabic Language Learning Media: Conventional, Multimedia, and AR

Aspects	Conventional Media	Interactive Multimedia	Augmented Reality
Interactivity	Low	Medium	Height
3D visualization	None	Limited	Ada, real-time
Student engagement	Passive	Active-passive	Fully active
Linguistic context	Abstract	Semi-contextual	Contextual
Development costs	Low	Medium	Medium-high

Potential Benefits of AR Pedagogy on Arabic Language Learning in Pesantren Based Elementary Schools

Studies of various studies show that AR has significant potential pedagogical benefits for Arabic language learning, especially in three main aspects: increased learning motivation, vocabulary mastery, and active involvement of students in language activities (Hamari et al., 2021; Barzanji & Mohammed, 2022).

First, regarding learning motivation, Hamari, Koivisto, and Sarsa (2021) in their systematic literature review on gamification found that interactive and visual elements such as those offered by AR are consistently positively correlated with students' intrinsic motivation (Hamari et al., 2021). These findings are in line with the research of Abdullah et al. (2025) on the integration of Wordwall and Problem-Based Learning in Arabic language learning in modern Islamic boarding schools, which shows that interactive digital media is very well received by students and teachers with acceptance rates categorized as excellent, without causing cultural resistance (Abdullah et al., 2025).

Second, in mastering vocabulary (*mufradat*), AR can visualize each word in the form of a three-dimensional object labeled Arabic and its meaning. Barzanji and Mohammed (2022) found that gamification significantly improved Arabic vocabulary mastery in EFL learners (Barzanji & Mohammed, 2022). Furthermore, Abdullah et al. (2025) in a study on the design of dictionaries based on information technology showed that a visual-innovative approach in the presentation of Arabic vocabulary has been proven to significantly improve Arabic language skills (Abdullah et al., 2025). AR offers a much richer dimension than just a visual dictionary, as students can interact with 3D objects and explore them from different points of view (Zuo et al., 2023).

Third, in the aspect of productive language skills such as speaking (*kalam*) and writing (*kitabah*), AR has the potential to create contextual language scenarios. Through location-based AR, students can simulate conversations in real-life situations—in a market, in a mosque, or at home—with dialogue guides appearing virtually in their surroundings (Islami et al., 2025). This constructivist approach, in which students build understanding through active exploration in a real context, is one of the strongest principles in second language acquisition (Fauzan & Arifin, 2023).

Table 3. Potential Application of AR in Aspects of Arabic Language Learning in Pesantren Based Elementary Schools

Aspects of Arabic Language	AR Content Examples	Key Pedagogical Benefits
Mufradat (Vocabulary)	3D objects labeled Arabic writing + audio pronunciation	Reinforcement of multisensory associations
Qawa'id (Grammar)	Visualization of the structure of the number of ismiyah/fi'liyah 3D	Visual understanding of sentence patterns
Kalam (Speak)	AR-based contextual dialogue simulation	Language practice in a real context
Qira'ah (Reading)	Interactive Arabic text with meaning animation	Improved reading comprehension
Kitabah (Writing)	Animated 3D Arabic Letter Writing Guide	Acquisition of Arabic writing rules

Challenges and Strategies for Integrating Islamic Values in the Implementation of Arabic AR

Despite its great potential, the literature review also reveals a number of significant challenges in the implementation of AR for Arabic language learning in pesantren-based elementary schools (Wahyudin & Aristiawan, 2024).

The first challenge is the limitation of technological infrastructure, including the availability of adequate devices for all students and the stable quality of internet connections. Wahyudin and Aristiawan (2024) identified infrastructure limitations as the main obstacle to digital transformation in Islamic boarding schools, although they also noted great opportunities if managed with the right strategy (Wahyudin & Aristiawan, 2024).

The second challenge is related to the readiness of Arabic teachers' digital competencies. Many Arabic teachers in Islamic boarding schools do not have experience in operating or developing AR content. Research by Novrizal et al. (2025) shows that structured technology training can effectively improve the digital competence of the academic community in the pesantren environment, so that a similar model can be applied to Arabic teachers (Novrizal et al., 2025).

The third challenge the most specific in the context of pesantren-based elementary schools is the need to curate AR content that is in harmony with Islamic values. Commercially available Arabic AR content is not always in accordance with sharia rules, for example in the visual representation of living beings or the use of un-Islamic background music (Rosyidah, 2024). Therefore, a curriculum team is needed that plays a role in selecting, modifying, or developing AR content independently in order to be in line with the vision of integrated Islamic education. Rosyidah (2024) emphasized that digital innovations designed by considering the values of

Islamic boarding schools are actually accepted harmoniously without causing resistance (Rosyidah, 2024).

The fourth challenge is the technical linguistic dimension. Arabic has script-specific (right-to-left writing), a hierarchy, and complex morphological rules, so the development of Arabic AR content requires Arabic linguists to be actively involved in the design process not just technology developers (Islami et al., 2025; Abdullah et al., 2025).

Table 4. Challenges of Arabic AR Implementation and Mitigation Strategies in Islamic Boarding School-Based Elementary Schools

Challenge	Impact	Mitigation Strategies
Limited infrastructure	Uneven access	Phased procurement & device sharing scheme
Teachers' digital competence is low	Implementation is not optimal	Structured training & ongoing mentoring
Content compatibility with Islamic values	Risk of content not compliant with sharia	Curation & self-paced content development by curriculum team
The complexity of Arabic linguistics	Language misrepresentation	Involvement of Arabic experts in content development

Conceptual Framework for Integrating Islamic Boarding School Values-Based AR for Arabic Language Learning

Based on the results of the above synthesis, this study formulated a four-layer integrative conceptual framework for the implementation of Arabic language learning AR in pesantren-based elementary schools (Hidayat & Syarifuddin, 2020). The first layer is the technology layer, which includes the availability of devices, AR platforms, and connectivity (Wahyudin & Aristiawan, 2024). The second layer is the pedagogical layer, which concerns the selection of aspects of the Arabic language (mufradat, qawa'id, kalam, qira'ah, kitabah) that are most suitable to be integrated with AR, as well as the learning approach used (Fauzan & Arifin, 2023). The third layer is the content and value layer, which ensures that each AR material is curated according to Islamic values and appropriate Arabic linguistic rules (Rosyidah, 2024). The fourth layer is the human resource capacity layer, which concerns the readiness of Arabic teachers in operating and utilizing AR media (Novrizal et al., 2025).

These four layers interact dynamically with each other. Limitations in the technology layer can be mitigated through pedagogical adjustments, for example the application of AR in turn in small groups. The strength of the value layer and content becomes the competitive advantage of pesantren-based elementary schools: Arabic AR content that explicitly contains Islamic values and scripts will be very different from commercial Arabic AR applications that are general, and it is this uniqueness that makes this implementation theoretically and practically contributive.

4. KESIMPULAN

This literature research examines the transformation of Arabic language learning based on Augmented Reality (AR) as an effort to build a more immersive and interactive learning experience in pesantren-based elementary schools. The results of the study show that AR is a technology that is able to combine three-dimensional digital objects with the real environment in real-time through the main components in the form of markers, display devices, and digital content. In the context of Arabic learning, AR provides an advantage in visualizing mufradat, grammar, and language scenarios in a more concrete way, thus providing a multisensory learning experience that connects visual, sound, and meaning aspects more effectively than conventional media.

From the pedagogical side, the use of AR has been proven to have great potential in increasing learning motivation, strengthening vocabulary mastery, and encouraging active student involvement in contextual learning. This technology is relevant for developing all Arabic language skills, ranging from mufradat, qawa'id, kalam, qira'ah, to kitabah. These findings also reinforce the results of previous research that affirmed the effectiveness of interactive digital media and gamification approaches in Arabic language learning, especially in Islamic boarding schools that require an innovative but still contextual approach.

However, the implementation of AR also faces a number of challenges, such as the limitations of technological infrastructure, the low digital competence of teachers, the need for content that is in harmony with Islamic values, and the linguistic complexity of the Arabic language itself. To overcome this, a gradual strategy is needed through the procurement of facilities, teacher training, the development of value-based curriculum, and collaboration with Arabic language experts. As a contribution, this research offers an integrative conceptual framework that includes technological, pedagogical, content and value aspects, as well as human resource capacity as a reference for learning transformation. However, this research is still conceptual and requires further studies based on Research and Development to test its effectiveness empirically in the field.

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